VISIT…

Into The Future With

Knowledge from Our Past

(Proceedings of the 7th Seminar)

A Sourcebook for

'VTT Scholar Quiz Competition 2008-09'

- **An Occidental Perspective of Sanskrit**
- **Traditional Practices**
- **Management**
- **Yoga and the Unborn Child**
- **Turmeric - Tradition and Science**
- **Calculus in India: A Journey into 15th Century**
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PREFACE

In a lecture at the British Academy in November 2000, Prof. Amartya Sen said: "Criticism is sometimes made of people who take pride in traditional, and classically old, British or English culture, and it has even been suggested that such belief must be seen as proof of their non-acceptance of a multi-ethnic Britain. Why so? Surely there is no conflict whatsoever in (1) fully accepting that the contemporary British population is a multi-ethnic mixture, which is supportive of the liberties and civil rights of different groups, and (2) maintaining at the same time that English traditional culture is far superior to anything that the immigrants have - or could have - brought."

If you substitute 'India' and 'Indians' for 'Britain' and 'British,' he might as well been addressing the Indian community. Why is it that we disallow a feeling of pride in our past, which is so inextricably linked with Hinduism and Sanskrit? While absorbing the good that came with other cultures and religions that made India their home, and which makes India the wonderful multi-ethnic mosaic it is today, can we not also feel pride in the ancient culture and language of this land?

It is extremely distressing to note the narrow interpretations of persons who link the hoary language to a handful of miscreants or abettors of religious and social discrimination [Please see Prof. Stella Sandahl's quotation in the lecture by Ms. Venetia Ansell. Ms. Ansell clearly stated that she did not agree with Prof. Sandahl's views in this context]. Let us make it clear that the Sanskrit language and the Hindu religion have nothing to do with the perpetrators of these wrongs. Such comments are voiced because we, the citizens of this country, meekly succumb to the notion that if we rightfully take pride in that which is "traditional and classically old," we are subjecting our multi-ethnic society to restrictive influences. As a consequence the words and actions of political tacticians and religious fanatics are misinterpreted by vested interests to sow seeds of discord in our society.

To use Prof. Amartya Sen's quote in the Indian context, there is nothing conflicting in maintaining that there are aspects of ancient Indian culture and tradition that are far superior to anything that the immigrants have or could have brought, provided we support the civil rights and liberties of all groups of peoples who make up the India of today.

Nations the world over are investing in preserving their traditional knowledge and culture. It is only in India that we talk of 'Sanskritisation' as something to guard against. Is it possible for a tree to survive if its roots are cut off? Would you want the Himalaya renamed simply because it is a Sanskrit word that means 'Abode of Snow'?

Sri Tirunarayana Trust **September 2008**

StudentSpeak

Nearly a hundred of the students who attended the seminar have used the feedback forms to voice their opinions about the individual talks and also give us their suggestions and ideas about the conduct of the seminar and the direction it should take in the future. Their thoughtful and lucid comments have been noted with deep gratitude. We will do as much as we can to address their concerns and incorporate their suggestions in future seminars.

Many have talked about the need to make the talks more interactive. Raksha B R has a unique suggestion. "Not only should we ask questions to professors, they should also ask us questions so that we get a chance of answering," she says.

Another popular demand is that lectures must address 'current' issues and concerns that affect the youth. The purpose of the seminar is to open students' minds to the immense potential of our rich heritage, which has lessons for all ages and times. Each of you is capable of absorbing the lessons delivered by our eminent speakers, interpreting them and applying them to address and resolve problems ranging from handling competition and stress to global warming and corruption. It is important to think up solutions for yourselves and not just depend on others to tell you what to do.

In this regard, one of the important messages of the seminar, as Yashoda V points out, is that it is not necessary to restrict yourself to any one position in life. With commendable commitment, all our speakers have pursued their interest in mining our rich ancient knowledge alongside their exemplary careers. You too can and must develop a holistic personality like them.

Yashoda has also asked for the inclusion of stories from Sanskrit literature in future seminars "since today's generation is more interested in reading western novels and stories like Nancy Drew and Harry Potter thereby forgetting Indian stories." This is a suggestion that has cropped up repeatedly in the student feedback. We will definitely keep it in mind for future seminars.

"Old values are the basis for new ideas. The topics were not known to many of the present day. I'm lucky to know about this," says Bhavana B.

"Such seminars are helpful to know our traditions and their values. The Vedas are relevant for all ages and we have now forgotten it," remarks Harshita S S.

"Though we attend many seminars, we learnt much in this one seminar and this knowledge will always remain with us, not only as [passive] knowledge but used in daily life," says Sangeetha. Perhaps the knowledge can matter "even in little ways", as Thrishna says.

Prakruthi N Raj feels strongly that Sanskrit should not be translated and those who don't know the language should simply go ahead and learn it. "The fragrance of Sanskrit should spread around the world in Sanskrit language itself," she says. We definitely look forward to the day when this will happen and it will, if more and more of you determinedly make some time to read and enjoy Sanskrit in the original, as often as you can, even as a change in-between chores. And we are sure you will make excellent resource persons for future seminars if you start from now to read, contemplate and absorb messages, little by little, from our ancient texts, not only in Sanskrit, but in all Indian languages.

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A NOTE TO STUDENTS

Some of you may have attended the lectures at the seminar *Into the Future with Knowledge from Our Past* held at the BMS Engineering College Auditorium, Bangalore, on 29th and 30th September 2008. In this booklet, we have tried to capture the essence and spirit of those lectures given by eminent professionals from diverse fields. A brief profile of these speakers is given on page 6 of this booklet. As you know, there will be a Quiz competition based on the contents of this Sourcebook. The details of the quiz are given below.

PRELIMINARY WRITTEN ROUND: (Open Book format. You may freely refer to your copy of this Sourcebook during the written quiz).

Date: 18th October, 2008 (Saturday) at 2 pm

FINAL ORAL ROUND:

Date: 25th October, 2008 (Saturday) at 2 pm

Venue for both the rounds: BMS College for Women, Basavanagudi, Bangalore.

Registration: Register yourself for the quiz before 17th October, free of charge, either with Dr. Shashi Rekha, Professor, Dept. of Sanskrit, BMS College for Women, Basavanagudi, or with Sri Tirunarayana Trust by sending email to tirunarayana@gmail.com. or on mobile 9731109114.

Prize: Winner is declared the 'VTT Scholar for the year' and will get a scholarship of Rs. 300/- per month for one year and a medal in sterling silver. Runner-up gets a medal in sterling silver. All finalists get certificates of merit.

In the scholarship year, the VTT Scholar is expected to do some research on the relevance of ancient Indian knowledge to the present day. The findings need not necessarily eulogize; a critical, scientific appraisal will be appreciated. Besides the scholarship, the VTT Scholar will also be given an opportunity to present a paper at the subsequent year's seminar, based on the student's research into the topic of the series, *Into the Future with Knowledge from Our Past.* The research should exhibit some original thinking and spirit of enquiry. It must not be merely a reproduction from existing literature available in books or on the Internet.

The purpose of the seminar and the quiz is to reach the message to the younger generation that India has a rich heritage of knowledge of which we need to be justifiably proud, and also that there may be much to learn from our past for application in the present times as there is a yearning all over the world for simpler, more natural and sustainable alternatives to solutions which, though technologically advanced, are often effective in the short term and create an adverse impact in the long term. So read the Sourcebook from this perspective and think of newer avenues for research on the topics presented.

You can send your ideas and suggestions to us at tirunarayana@gmail.com.

Happy Reading!

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A BRIEF PROFILE OF OUR SPEAKERS[1]

1. **Dr.Kamala Krishnaswamy**

Emeritus medical scientist.

Director of National Institute of Nutrition, Food and Drug Toxicology Research center and the National center for Laboratory and Animal Science. Formerly President, Nutrition Society of India.

Engaged in nutrition research for nearly four decades and made valuable contributions in the field of clinical nutrition and cancer.

An internationally renowned specialist in Internal Medicine and Nutritional Sciences and recipient of several awards and orations.

Has authored a book on Turmeric's efficacy – *Turmeric the Salt of the Orient is the Spice of Life.*

2. Dr S Kannan

Chartered Accountant, Management Accountant, Certified Information Systems Auditor and Certified Information Security Manager.

Ph.D. in Commerce and Ph.D. in Management and Sanskrit in the domain of Vedic management.

Has twenty-five years of industrial experience as a senior professional.

Has authored books on corporate laws, industrial laws and project management and has recently published *Vedic Management: The Holistic Approach to Managerial Excellence.*

3. **Prof. K Ramasubramanian**

Has a PhD in Theoretical Physics from IIT Madras, M.A. in Sanskrit and *Vidwat Pravara* from Sri Sringeri Sharada Peetham.

Recipient of this year's President of India award *Maharshi Badarayan Vyas Sanman* in recognition of his work in Sanskrit and Indian Science.

Teaches at the Cell for Indian Science and Technology in IIT Bombay

Authored/ co-authored *An Introduction to Ancient Indian Mathematics*, *Five Hundred Years of Tantra Sangraha – a Landmark in the History of Astronomy* and a two-volume translation of the *Ganita-Yukti-Bhasa* of *Jyesthadeva*'.

His research interests are Indian Science and Mathematics, Sanskrit & Physics.

[1] The names of the speakers are listed alphabetically.

4. **Dr. Shamanthakamani Narendran**

M.D. Pediatrics and Ph.D. in Yogic Science, Gold medalist in MA Philosophy, has an MA in Kannada and a diploma in Journalism.

Eminent Paediatrician and Neonatologist, Yoga therapist and writer.

Has published two books on Child Care.

Presently engaged in extensive research on the efficacy of Yoga in pregnant women.

Takes active part in rural health projects and other community services. Broadcasts regular programmes on All India Radio and Doordarshan.

Recipient of many honours and awards.

Dr T V Subramanian

Fellow in Management from the Indian Institute of Management, Ahmedabad, Honorary Fellow of the Indian Institute of Materials Management.

Renowned management consultant and academician.

Has executed more than 50 major consulting assignments and conducted more than 500 management development programmes in the areas of Strategic Management, Supply Chain Management, Operations Management and Information Technology Strategies.

Deeply interested in the *Shastras*, Philosophy, Sanskrit and Tamil literature, and spoken Sanskrit.

5. **Ms Venetia Ansell**

Student of Sanskrit and Classics (Latin and Greek) at the University of Oxford.

Currently works in the publishing industry.

Author of a Sanskrit Literature Forum which aims to focus on literary texts – poems, plays, stories and so on.

Dr A N Yellappa Reddy, I.F.S.

Renowned for his service as the Conservator of Forests and Environment Secretary of the Govt. of Karnataka.

At present a Governing Council Member of Ecology Council of India, and Chairman, Task Force, Irrigation Dept., Govt. of Karnataka and Trustee, The Bangalore Environment Trust.

Advisor for herbal research (*Vrikshayurveda*) to many Ayurvedic Organizations.

Has contributed many papers to well known national and international journals on Sustainable technologies, Environment and Forestry.

Recipient of many honours and accolades for distinguished service to the society.

Has mentored the Biodiversity Park of the Bangalore University.

REBRANDING SANSKRIT – AN OCCIDENTAL PERSPECTIVE

***Venetia Ansell*[2]**

Myths & Misconceptions about Sanskrit

There are common beliefs about Sanskrit that are prevalent today, many of which are only half-true and some simply wrong. Let us look at a few of them

MYTH ONE: Sanskrit is an ancient language which is now all but obsolete and thus of little relevance

Fact: Sanskrit is a contemporary, living language as well as an ancient one.

Sanskrit is very much alive. It is not a dead language, unlike Latin and Greek which are no longer spoken. Sanskrit is still spoken by an estimated 50,000 (as of the 1991 census) in India alone. For some, it is their mother tongue. Spoken Sanskrit is taught in countries from the US to Japan. King's College London is just about to start a Spoken Sanskrit evening class. *Samskruta Bharati* has taught thousands of people to speak Sanskrit, and has trained over 70,000 teachers. New Sanskrit words are being created for modern inventions: a video is '*chitra-mudra*'; a visa is '*pravesha-anumati*'. This is one of the signs of a living, vibrant language. Isn't the English language constantly expanding to include newer terms for newer inventions, and also including words from other languages such as Hindi?

MYTH TWO: Sanskrit is simply the religious language of *Brahminical* Hinduism.

Fact: This is an important aspect of Sanskrit. But we must remember that Sanskrit is much more than just the Vedas and temple chants. Sanskrit as a language is not and need not be affiliated to any religion.

Sanskrit is not just Hindu. Sanskrit is closely associated with Hinduism for historical reasons and even today it is most visible in connection with the Hindu religion. But, the language is used in all kinds of contexts: a *Kashmiri pandit* can use Sanskrit to talk to a *Kannadiga* scholar; there are two daily news bulletin in Sanskrit on All India Radio, a Sanskrit newscast on Doordarshan at 6:55am daily; it is a household, everyday language as so many Sanskrit words have been adopted by Indian languages [eg: it is also the major language of temple *stotras* all over India.

Religious Sanskrit texts form just one part of the corpus – there are political texts such as the *Arthashastra*, poetry such as *Meghadutam,* discourses on medicine such as Ayurvedic texts dealing with specific subjects such as child care and care of plants and trees. And, of course, there are numerous

2 The article is based on Ms. Venetia Ansell's presentation at the seminar, *Into the future with knowledge from our past'*, held in Bangalore on August 29 and 30, 2008 and information available in public domain on the web.

Sanskrit texts on various sciences – from mathematics to metallurgy and on creative arts – from dance and music to art and cooking! There is even a book on toxicology called Khagendramanidarpana.

MYTH THREE: Sanskrit is essentially Indian, and is of no interest to anyone outside India.

Fact: Sanskrit is, of course, a vital part of the Indian cultural heritage. But, just as the influence of Greek and Latin have spread far beyond their countries of origin, Sanskrit has universal appeal.

Sanskrit is Global. Sanskrit has travelled all over the world. It is not just confined to India. Several of the world's top universities offer Sanskrit degrees, including Harvard and Oxford. The Japanese syllabary[3] system is thought to have evolved from the *Siddham*[4] script. Sanskrit dictionaries and textbooks are published in languages from Hebrew to Russian to Portuguese. Earlier this year, a Chinese scholar, Ji Xianlin[5], was awarded a *Padma Bhushan* for his contributions to the study and dissemination of Sanskrit. In St James' schools in London, children are taught Sanskrit from the age of 4 ½.

A European ENT specialist came to Bangalore to learn Sanskrit in order to access certain useful medical texts.

If we ask ourselves what the present status of Sanskrit in India is, we find that in India it is being sidelined as a language only of instruction and religion, and branded exclusively Hindu. In particular, the promotion of Sanskrit as a contemporary language is often seen as part of a Hindu right wing conspiracy. This common mis-perception can be seen even among learned Sanskrit professors, such as, Professor Stella Sandahl of the University of Toronto, as illustrated by her recent remark:

> "It is very sad to see how the ignorant Hindutva forces demean and make the wonderful classical language into something trivial and ridiculous. How do we stop them? How can we rescue Sanskrit from these vandals? I doubt that the student (of modern spoken Sanskrit) can read and understand even one line by *Kalidasa* or *Bana* or *Jayadeva*. But he can cut the throat of those who cannot speak his

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3A syllabary is a set of written symbols that represent (or approximate) syllables, which make up words. A symbol in a syllabary typically represents an optional consonant sound followed by a vowel sound. The Japanese language uses two syllabaries together called kana, namely hiragana and katakana (developed around 700 AD). They are mainly used to write some native words and grammatical elements, as well as foreign words. -Wikipedia

4Siddha [Sanskrit सिद्धं,"accomplished" or "perfected") — is the name of a North Indian script used for writing Sanskrit during the period ca 600-1200 CE. Descended from the *Brahmi* script via the Gupta script, which also gave rise to the Devanāgarī script as well as a number of other Asian scripts such as Tibetan script. -Wikipedia

5Ji Xianlin (born August 6, 1911) is a Chinese linguist, paleographer, historian, and writer who has been honored by the governments of both India and China. He is one of China's greatest scholars of ancient Indian languages and culture. -Wikipedia

so called Sanskrit. When he is not busy demolishing mosques and raping nuns."

Unfortunately in India Sanskrit suffers from obscurity. Sanskrit literature suffers not from an image problem but from a lack of visibility. Many are unaware of Sanskrit's literary wealth, not to mention the huge amount of writing on everything from agriculture to mathematics, from philosophy to medicine – much of which the other speakers here will be discussing over the next two days. I will focus on the literary texts (fiction) in particular.

Rebranding Sanskrit

In order to rebrand Sanskrit, we need to reconsider the perception of Sanskrit in India, and adapt its image for today's MTV generation. In order to popularise Sanskrit in India, it needs to be seen as relevant and interesting, and open to all, including the Muslims, Scheduled castes and non-Indians as well as Brahmins.

The Western world has shown itself receptive to the Sanskrit language and literature - when introduced to it - since it was first 'discovered' by colonial scholars. However, most people outside India are barely aware that the language and its literature exist. While I was studying Sanskrit in London many asked me what I was studying. They exclaimed 'How wonderful' thinking I was studying **Sand-Script**, some script of the primitive man!

Once India has given birth to this new rebranded Sanskrit avatar, it should be promoted abroad. For now, though, the focus should be on burnishing Sanskrit's faded image in India.

Why is Sanskrit still relevant?

It is an important part of the study of philology.

Let us recall what Sir William Jones[6] said about 200years ago. Speaking to the Asiatic Society in Calcutta (now Kolkata) on February 2, 1786, he said:

"The Sanskrit language, whatever be its antiquity, is of a wonderful structure; more perfect than the Greek, more copious than the Latin, and more exquisitely refined than either, yet bearing to both of them a stronger affinity, both in the roots of verbs and in the forms of grammar, than could possibly have been produced by accident; so strong, indeed, that no

6 Sir William Jones (September 28, 1746 – April 27, 1794) was an English philologist and student of ancient India, particularly known for his proposition of the existence of a relationship among Indo-European languages. He was also the founder of the Asiatic Society. - Wikipedia

philologist[7] could examine them all three, without believing them to have sprung from some common source, which, perhaps, no longer exists."

Since Jones' discovery that Sanskrit is a sister language of Latin and Greek (via Indo-European) and thus indirectly related to English and other European languages, Sanskrit has become an important part of the study of philology.

English and other European languages reflect this indirect relationship, e.g.

- stha/staanam – sto – stehen – stand, steady, stool
- bhratr – brother
- dvara – door

Its logical structure has relevance for use in computer programming

If we consider the logical structure of Sanskrit, Sanskrit grammar is famously logical (and difficult). But it was this fact – that the language is so logical and lacks ambiguity – that led a NASA researcher, Rick Briggs (http://www.gosai.com/science/sanskrit-nasa.html), to write a paper in 1985 explaining why it would be ideal for knowledge representation with artificial intelligence – i.e. it could program a robot. Since then, much has been discussed and written on Sanskrit as a language of computers and machines.

Its vocabulary and versatility are incredible

If we look at the beauty of Sanskrit, where most languages settle for one basic word to describe a tree or river, Sanskrit uses thousands of synonyms. For instance, a selection of words beginning with 'a' that means the sun:

- Aditya
- Abjahasta (holding a lotus in his hand)
- Akaajapathika (sky traveller)
- Ambaaramani (jewel of the sky)

And, this is just in one letter of the Sanskrit alphabet. If you move through the lexicon, you're likely to find many more synonyms for sun, such as the well-known 'surya'.

Often a basic noun is referred to by its epithet (although this is often for metrical reasons)

- Jalada/dhumayoni (smoke-created)= cloud

7Philology is the study of literary texts and of written records, the establishment of their authenticity and their original form, and the determination of their meaning.

- Shatapada /gandhalubdha (enticed by smell) = bee
- Bhubhrt/acala = mountain

The imagery employed by Sanskrit poets in their work is marvelous. Look at this:

गच्छन् स वारीण्यकिरत्पयोधेः

कूलिस्थितांस्थानि तरुनधुन्वन्

पुष्पास्तरांस्ते sण्गसुखानतन्वांस्तन्

किन्नरा मन्मथिनो sध्यतिष्टन्

(*Hanuman*) scattered the waters of the ocean as he went

The waters shook the trees which stood upon the shore

The trees shook out beds of flowers delighting the senses

And *Kinnaras*, *Manmatha*-maddened, seated themselves upon them.

Verse 23, Canto X

Bhatti-Kaavya[8]

Observe the domino effect (a chain reaction) Scattered waters – shaking of trees – spread of a bed of flowers – *Kinnaras* seated on the flowers!

Sanskrit is known for its versatility and malleability. You can express an idea in many different ways. Sanskrit is incredibly versatile.

Sanskrit abounds in 'Trick verses'. In the same *Bhatti Kaavya* that we saw earlier a small change in the case of a word makes the sentence convey different meanings! Observe this:

बभौ मरुत्वान् विकृतः समुद्रो

बभौ मरुत्वान् विकृतः समुद्रः

बभौ मरुत्वान् विकृतः समुद्रो

बभौ मरुत्वान् विकृतः समुद्रः

Marut's son who had accomplished various tasks and who possessed the means of cognition (crest jewel) shone

8 Bhatti is a mid 6th Century Poet in Sanskrit. He is author of *Ravana vadha* which is also known as *Bhatti Kavya. It* is an epic poem in the Silver age of Sanskrit literature. Bhatti Kavya was written for illustrating the rules of grammar and its sister rhetoric. *Bhatti Kavya* is valuable for a student for its copious illustration of the grammatical treatises of *Panini* and *Vopadeva. Some scholars identify* Bhatti *with Bhartr Hari* the author of *Vakpadiya.*

The excited lord of the gods accompanied by divine damsels became radiant

The ocean which, wind-struck, had crossed its boundaries, appeared grand

Full of joy, the wind whose speed was reduced seemed attractive.

A Sanskrit *mahakavya* verse is notoriously complex and difficult to translate. But Sanskrit can be incredibly simple to understand.

Sanskrit was used for everything from royal decrees to philosophical debates to technical treatises. The language is amazingly malleable – an entire sentence can be expressed in a word, and word order doesn't affect the sense – a fact that poets played on to good effect.

The Influence of Sanskrit Literature across Place and Time

Sanskrit writers, of which there were many, were often prolix [wrote profusely]. There is a multitude of literary texts, many of which have not yet been translated. Indeed there may be several which have not yet been discovered. These texts deserve far greater recognition and influence than they currently enjoy. When given a chance, they tend to be popular and often inspire great works of art as the following paragraphs indicate.

In pre-modern times, Sanskrit plays, poems, epics, novels and stories have given rise to hundreds of interpretations and re-imaginings. E.g. Ramayana of *Valmiki* spawned all manner of Ramayanas, from the Hindi one of *Tulsidas*, to the Tamil *Kamba Ramayanam*. Some texts, such as the *Kathaasaritsagara*, spread farther afield – influencing (most probably) both the Arabian Nights of the Middle East and Grimm's Fairy Tales. The story of the crocodile and the monkey (from the Jataka) appears in a medieval Japanese collection of stories. The distance these stories travelled in an era before the invention of the printing press and postal system, let alone our modern tools of communication, is testament to their popularity.

The *Mahabalipuram* sculptures depicting the penance of Arjuna and a Cat are examples of adaptation and humour.

We find the influence of Sanskrit literature even in our present times. These same texts have proved themselves popular across centuries and continents. There are artists of all types all over the world working with this material.

For example:

- The Oregon Shakespeare Festival this year is presenting 'The Clay Cart', which is an interpretation of *Sudraka's Mrichchakatika*.
- The British Library in London is currently hosting a Ramayana exhibition based on the 17th Century Mewar manuscripts.

- A successful American banker recently started the 'Clay Sanskrit Library', a publishing programme designed “to introduce Classical Sanskrit literature to a wide international readership”. The books, which show the Sanskrit text alongside the English translation, are designed for the layman reader. So far, they’ve published about 40 volumes.

A new image for Sanskrit today

We need to rebrand Sanskrit and recognise that Sanskrit is a living language for today. Sanskrit is part of India’s cultural heritage but it need not be seen as solely Brahminical, Hindu or even Indian. Its appeal transcends religious and national borders. The incredibly rich canon of Sanskrit literature is fertile ground for contemporary artists, playwrights, authors and musicians. These texts need to be re-imagined in order to stay alive.

In the West, Sanskrit is still predominantly the preserve of academics and Indian Diaspora communities. While Indian pop culture (Bhangra, Bollywood) has penetrated far and wide, most people have not yet heard of Sanskrit. The few examples cited above show how popular it can be and how much interest in can generate when people are introduced to it.

India, as a fast-developing country, has caught the world’s attention for many things, from Tata’s buyout of Jaguar and Landrover to Abhinav Bindra’s gold. The country has matured enough to offer the world cultural exports as well as software engineers and doctors. In a post-colonial world, India need no longer pander to Western cultural snobbery – it should aim to make the Mahabharata as famous as the Iliad, and to propose Valmiki as a rival to Virgil.

But before India and Indians can export Sanskrit abroad, it needs to be given a fresh lease of life at home.

And finally, for those of you who are interested in the promotion of Sanskrit and its literature in particular, I would like to invite you to participate in and contribute to the Sanskrit Literature Forum at www.venetiaansell.wordpress.com.

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SAMSKARA AND *UPASANA* FOR PERSONALITY DEVELOPMENT AND INDIVIDUAL EXCELLENCE - A FRAMEWORK FOR HUMAN LIFE

***T V Subramanian*[9]**

What are *Samskara and Upasana* - *w*hy do we need them?

I am going to talk on traditional practices and highlight the relevance these practices to you. I am going to touch upon on two aspects. One is *Upasana*, and the other is *Samskara.* What are these and what are their relevance.

The scriptures of all religions convey only one core message, a central message, and quintessence message: Love everyone; in fact love all creatures – the *prema bhava* – for we are all God's children, His creation. The moment we start reflecting on this central message, we find that even though we all agree with this sentiment in principle, in practice we find it a problem to operationalize this, to implement this.

I don't like the next door lady, how can I love her? I don't particularly approve of such and such a person, how can I include him? Let me not include him also. Apart from this, I have to take into account one more aspect. A person is useful to me, he knows someone who can get admission in school for my children. I should love him, like him, because of his connections, his network. I cannot exclude such a person, I will include him. Therefore now we have got two lists - a list of inclusions and another of exclusions. Soon we get into one more aspect and after some time we start developing a third list – a list of persons to whom we are indifferent. Neither are they useful to me any longer, nor do I have any particular reason to like them.

We have our likes and dislikes, preferences and prejudices. We like people who like us, who speak well of us and who are useful to us. Even this is transitory. People whom we liked before, we no longer do so, for our preferences have changed. Or, they are no longer useful to us. Or, we have found others who are more useful.

So, it is a fact that we do not treat everyone alike. We indulge in discrimination. In order to like everyone alike, we should observe Nature and learn from it. Nature does not discriminate, it treats all alike. Thus said Lord Krishna: "*Samoham Sarvabhooteshu, na me dveshti na me priyaha* - I have equal love towards everyone, I hate none, I have no preferences". Thus divinity is in Nature, Krishna is in Nature, He is in the Tree, He is in the River. If Krishna is everywhere we as human beings are more evolved, why is He is not in us? He is also in us, divinity is present in all creatures and that includes us. Divinity is part of our being. Krishna's innate quality, intrinsic

[9] The article is based on Dr Subramanian's presentation at the seminar, *Into the future with knowledge from our past'*, held in Bangalore on August 29 and 30, 2008 and information available in public domain on the web.

quality is selfless unconditional love, compassion and creativity. If divinity is in every one of us, why doesn't it manifest itself out of us? That is because of our inadequate preparation. Just as shining gold is obtained after several successive processes have been carried out on the ore, in the same way divinity in us manifests through successive processes of purification and refinement. Such a process is called *Samskara* and our effort in this direction is *Upasana*.

Due to previous negative impressions that we have, such as anger, greed, intolerance, wrong actions – acts of omission and commission, acts arising out of our ego etc., the divinity in us does not manifest itself. We all talk about GIGO - Garbage in Garbage out. In our context we should recall another acronym EIGO, what is this? Ego in God out. Some people define Ego as 'Evict God Out'. These negative impressions that we have imbibed from a long time - may be over several births, are called *vasanas.*

Samskaras help to refine or purify the *vasanas.* These impressions result from our previous actions or *Karma*. *Samskaras* help to rid ourselves of *vasanas* and give shape to such excellent qualities as inner balance, refined, polished and civilized behaviour. *Samskaras* also strengthen us to withstand stress and strains that everyone faces during different stages of life. *Samskara* also means an obligatory sacred rite, or a religious ceremony, or a rite of passage.

There are several purposes to *Samskara*, such as, the popular purpose, social purpose, cultural purpose and moral purpose.

- The removal of unfavourable or hostile influences, attraction of favourable influences and material gain are the aspects of popular purpose.
- When *samskara* enables self-expression, it becomes the social purpose.
- When *samskara* helps in removing bodily impurities and mental impurities, it serves cultural purpose.

Society bestows certain rights and privileges on those who are thus freed. A person, who has devoted his entire life in pursuit of knowledge, even though poor, is accorded respect in an assemblage where learned discussions take place. Similarly a person who has led a life of equanimity is respected and approached by strife-filled individuals and society.

The moral purpose is served when *samskara* equips and prepares the person to acquire the eight qualities of the soul or self – *Atma Guna,* which enable you to lead a meritorious life. What are these eight qualities? They are mercy, forbearance, freedom from envy, purity, calmness, right conduct, freedom from greed and freedom from covetousness.

Formation and Development of Personality

Samskaras cover the full span of life, indeed it even include life after death through the vehicle of Soul or Self, the *Atman*. They guide and direct an individual to lead a life full of discipline. His energies flow into a well guarded purposive channel.

In the Hindu way of life, the following *samskaras* used to take place at pre-ordained intervals in an individual's life. They are:

Garbhadana - The coming together of husband & wife for bringing about conception

Pumsvana - Performed when the first signs of conception are seen, desiring a male child

Seemanta - Parting of hair of the expectant mother to keep her spirits high & positive, accompanied by soothing music

Jatakarma - After birth of the child, he is given a secret name and the taste of honey & ghee, mother starts the first breast-feeding

Namakarana -the child is given a formal name

Nishkramana – the child is shown the Sun & the Moon

Annaprashana - the child is given solid food for the first time

KarnaVedha - Piercing of the ears carried out during the 7th or 8th month

Chudakarma - *Chuda* refers to the 'lock or tuft of hair' kept after the remaining part is shaved off

Vidyarambha / Vedarambha / Upanayana - The thread ceremony, the child begins his studies under a Guru

Keshanta – Hair is cut, G*uru dakshina, the offering to the Guru,* is given

Samavartana – Returns home after education

Vivaha – Marries for receiving and providing companionship and to bring forth social welfare

Vanaprastha – Retirees from active life, for a life of meditation & reflection

Sanyasa – sheds all relationship in order to remain detached from the world and to feel oneness with the entire world

Anthyeshti – the last rites on casting off his body.

Samskara is not merely the ceremonial practice of ritual as it prevails today. It is a *sadhana* – a spiritual accomplishment. They are intended to be the outward, visible signs of the spiritual grace that has helped an individual reach certain milestones in life. When the *samskara* bears fruit the experience sanctifies the whole personality of the individual. *Samskara* is a spiritual *Sadhana*, they are an outward visible sign of an inner spiritual grace. Therefore, practicing *Samskara* is a living spiritual experience and not the lifeless formalism that we follow these days.

Samskaras, when observed in the right spirit and not merely in the letter, make our body a valuable possession that is purified and sanctified so that it becomes a fitting instrument of the divine intelligence embodied in it. Through them the individual begins to understand that all life is sacred and every physical action should be connected with the spiritual reality.

Samskara **and** ***Upasana*** **and Individual Excellence and Personality Development**

We can perform samskaras in two ways – as a *prarthana* or as an *upasana.*

The first is Prayer (*Prarthana*) by which we seek certain benefits. Eventually, as one gets benefits at every stage, one develops faith in the power of the Almighty and seeks benefits of a lasting nature.

Upasana, on the other hand, means sitting near God, moving closer to Him, becoming more intimate with Him! You contemplate and meditate on God, who is the parent of all of us. Just as mortal parents provide all the things necessary to lead a healthy and prosperous life, God has also given us various instruments to lead our life happily and well. His gifts to us are: our Intellect, healthy emotions and physical energy.

True *upasana* is expressing gratitude to God for all that He has provided and fulfilling His expectations by properly making use of all that He has given us, making the divine parent proud of us, offering all our successes at His feet (*Samarpana Bhava*) and treating all that we receive as His grace (*Prasada*).

Upasana should be our goal rather than praying for material benefits. In this way, we can develop a wholesome personality, using the God-given intellect, emotions and energy to better ourselves so that He may feel proud of us, His children.

Upasana is also a way of connecting oneself to the source of Creativity and Love.

Just as a good conductor becomes hot when connected to a source of heat, an electrical device gets charged when connected to a power source, so also an *Upasaka* gets the grace and glow of divinity through his *sadhana*.

Excellence is achieved when negative tendencies are washed away and our energies are channelled for purposeful action.

Development of discipline through proper performance of *samskara* leads to focused action. Connecting to the Supreme force through *upasana* develops a holistic personality and inspires creativity.

Thus with *Samskara* and *Upasana* a person becomes physically energized, emotionally connected, mentally focused and spiritually aligned.

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VEDIC MANAGEMENT – THE HOLISTIC APPROACH TO MANAGEMENT SCIENCE

S Kannan[10]

We often hear the phrase 'managerial excellence.' It is used in the context of running an organization efficiently in order to bring profits to its shareholders. In addition to making profits for shareholders, we speak of bringing benefits to a wider group encompassing employees, suppliers, customers and society at large.

In this era of globalization the world itself becomes our society, as organizations are no longer limited by geographical boundaries or even national boundaries. We talk nowadays of 'trans-national corporations.' In this context, what should be the vision of managerial excellence? This vision should be as large as our world is and should benefit the whole world and not merely any one section of it.

The *Vedas*, of course without intending to specifically address modern organizations, prescribe methods for individual and social well being, the ripple effect of which will embrace the whole world. Specifically, the *Vedas* speak of:

the individual,
his relations or interactions with others in society,
his relationship with the cosmic order, and most importantly,
his relationship with himself and with the Supreme Being.

The 'society' for which the *Vedas* were enunciated is not limited to India, for there is no narrow concept of 'nation' in these scriptures which are universally acclaimed as the world's most ancient works. Whatever has been said in the *Vedas* is applicable to the entire mankind.

Keeping this in mind, let us look at a framework for achieving managerial excellence, as enunciated in the *Vedas*.

I am not going to give in this talk details of the *Vedic Suktas or mantras*, for they are too many in number, and it could even be a distraction for those who are not initiated into them, or familiar with them. If the ideas presented here appeal to you, you can yourself make an attempt to identify these, or refer to my book 'Vedic Management' published by Taxmann Publications Pvt. Ltd.

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10 The article is based on Dr Kannan's presentation at the seminar, *Into the future with knowledge from our past'*, held in Bangalore on August 29 and 30, 2008 and information available in public domain on the web.

Framework for achieving managerial excellence

My framework for managerial excellence [See Figure 1 on the next page] has been designed based on the Vedic texts appearing in their four divisions, namely S*amhita*, *Brahmana*, *Aranyaka* and *Upanishad* of the four Vedas -*Rg, Yajur, Sama and Atharva*.

You will notice that in this framework the Vedic sayings have been classified, as mentioned before, into those pertaining to Self Management, Relationship Management, Cosmic Management and Spiritual Management.

These are further grouped as pertaining to the means to achieve excellence, the values one should strive for in this attempt to obtain excellence and the power that one should develop in the realms of determination, knowledge and action.

When these suggestions in the Vedas are acted upon, an individual, or a social entity, attains *Vaishishtyam* - excellence that will contribute to or lead to universal development, welfare and peace.

Development of qualities

It is said that every human being is born with three basic qualities (*triguna*). The proportion of these qualities with respect to one another varies from individual to individual. These qualities or *trigunas* are:

Satva – Equanimity, Tranquility, Detachment, Purity, Creativity, Sacrifice, Discipline, Knowledge

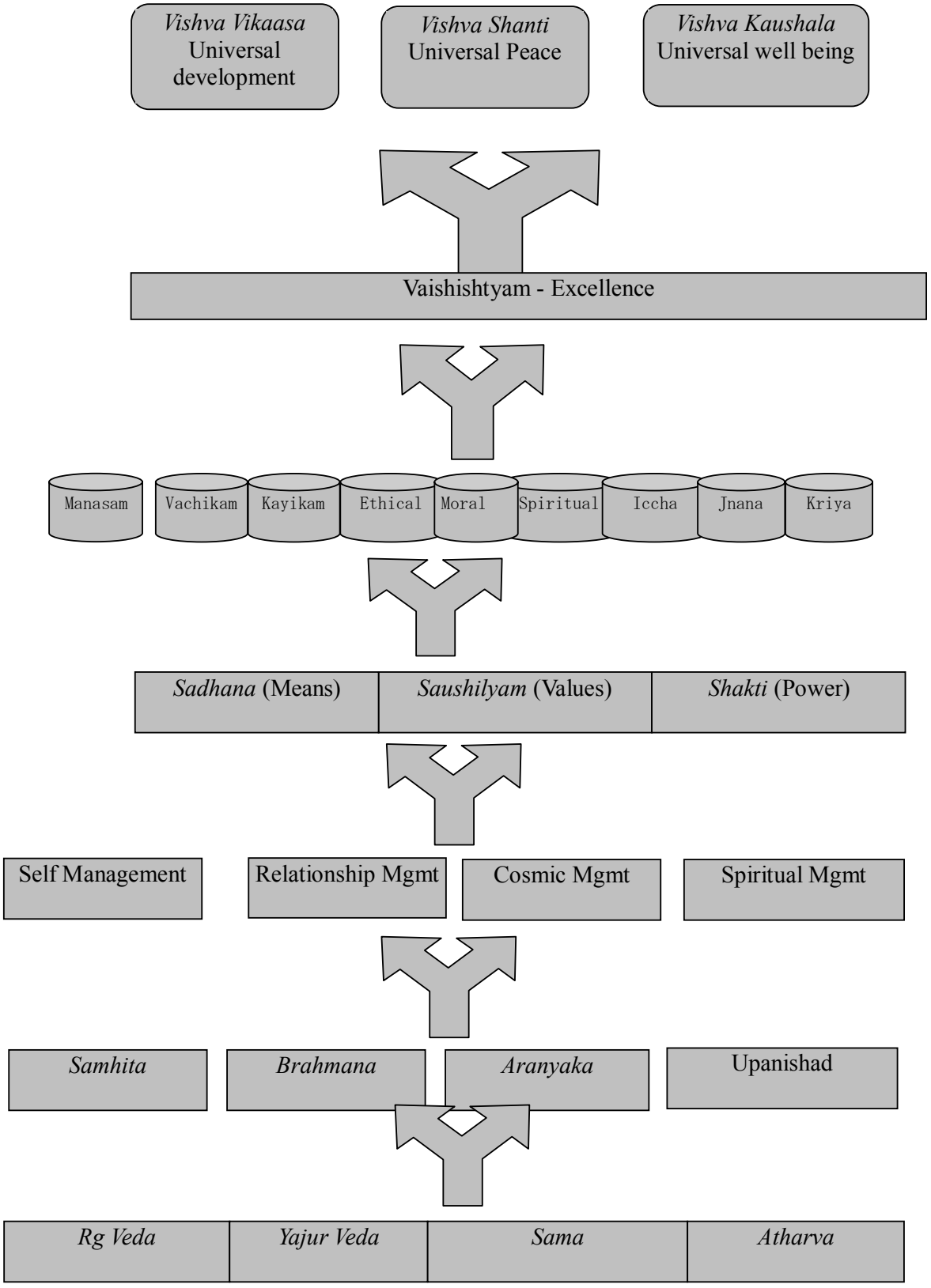
Rajas – Passion, Attachment, Result-centeredness, Restlessness, Destructive mentality, Ego, Selfishness, Anger

Tamas – Indolence, Indifference, Dull, Inactive, Ignorance, Delusion

These qualities are as applicable to a social entity as it is to an individual.

To lead a life of excellence we should strive to increase our *Satva guna* or quality that enhances our discipline, knowledge, creativity and our ability to satisfactorily conclude an action. At the same time we should also control our *Rajasic* and *Tamasic Guna*s, to minimize their influence in our daily life.

Figure 1: Excellence Framework



Development of a holistic personality

In order to develop qualities that lead us to excellence, we must make our personality flower through *Sadhana that* is "focused consistent and persistent effort over a period of time".

The *Vedas* enunciate personality traits in several planes. These are:

- *Annamaya* – Physical, Materialistic plane
- *Pranamaya* – Energetic, Action-oriented plane
- *Manomaya* – Emotional, Sentimental plane
- *Vijnanamaya* – Intellectual, Judgmental plane
- *Anandamaya* – Creative, Visionary plane

Thus, the *Vedas* recognised that an individual's personality transcends several planes and each of these planes is important in the development of a holistic personality.

Excellence in action

We must first understand what the *Vedas* define as activity or action or *karma*.

The *Vedas* speak of three fold *Karma*. These are:

Sanjita - Sum total of all accumulated *karma*

Prarabdha – *karma* that have started to yield fruit, which have to be exhausted only by experiencing

Agami – *karma* that are accumulated now to be experienced in future.

What this means is none of our actions are without linkages. *Karma* includes all our actions whether done in the past, or being done now or that which will be done in the future. Therefore the *Vedas* say that it is essential to follow the path of righteousness while carrying out an action.

Every action has to and will result in some fruit, though not necessarily the one that we aspired for. What is required is that we act with single-mindedness, with one single thought, of holistic excellence. A person who does not act in this manner is a social evil, say the *Vedas*.

What is Right Action?

That which is done keeping the following precepts in mind is what the Vedas describe as 'right action'.

- Work for the sake of work without attachment to its fruits
- Work with a Yogic mind [Follow *Svadharma* - Accept that work or action that has 'chosen' you and be free from stress and distress due to desire for that which has not come to you.]
- Live fully at the present moment without guilt of the past and anxieties of the future [Past = History. Future = Mystery. Present = Gift (Reality)]
- Think of the past as a product of destiny *Prarabdha* and future for a noble goal to be attained in worldly and spiritual spheres
- Learn to enjoy action such that intense work itself becomes rest.

The *Vedas* advise us to strive for Financial Excellence, but with a rider - Acquire wealth only by deeds of glory. It is incumbent upon us to maximize wealth, distribute wealth and conserve wealth, not only for our sake, or for our family's sake, it should be done for the prosperity of society. Besides, the Vedas state that wealth is not just money. It is both *Vittam and Vedyam*, money and knowledge.

All our actions must be grounded in ethics – *Dharma.* Further we must excel in transparency. Perfect alignment of our Thought, Speech and action. Thus we enter Truth from Untruth.

We must perform our svadharma – the responsibilities assigned to us - with the spirit that we are inferior to none. We will soon notice that infinite strength springs from the Self – the *Atman* - that bestows the bliss of creativity.

We must also be conscious of, aware of, the environment that is the society in its larger perspective. We must accept diversities; share our knowledge with others, for only that brings universal prosperity.

We must accord equal respect to all forms of life, including plants and animals. And this respect should issue forth in our actions.

We should also learn to accept facts, even those that are not favourable to us. If we don't, we succumb to re-action. Re-action, or reaction as we call it, is a happening. It is a result of what we perceive rightly or wrongly. Examples are sadness, anger, frustration, jealousy, despair and hatred – which are all negative emotions. When we are unable to face facts and accept them for what they are, we should seek help rather than react negatively.

How do we attain these personality traits outlined in the *Vedas* so that we can become managers, first of ourselves and thereafter the society?

We should start with self-diagnosis. We should periodically ask ourselves the following questions:

- What are my strengths? How do I fortify these?
- What are my weaknesses? How do I overcome them?
- What is my personality? How do I improve?
- How do I excel as an individual or as part of a social group?

In conclusion, I would like to quote a Vedic statement for attaining universal development, universal well being and universal peace that excludes none, includes every being.

समानं मन्त्रमभि मन्त्रये वः समानेन वो हविषा जुहोमि ॥

समानी व आकूतिः समाना हृदयानि वः ।

समानमस्तु वो मनो यथा वः सुसहासति ॥

Common be your prayers, Common be your goal,

Common be your purpose, Common be your deliberations,

United be your hearts, United be your intentions,

Perfect be the union amongst you.

--- Rg Veda x-191-3 to 4

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CARE OF THE UNBORN CHILD WITH YOGA IN THE PRESENT AGE

***Shamanthakamani Narendran*[11]**

The topic that I am going to talk on today is the care of the unborn child. How can you treat or take care of the foetus inside the womb of the mother? And, how can yoga help in this regard.

Indian sculptures, dating from centuries past, depict *Kali* or *Shakti* giving birth to a child, giving birth to the universe. These sculptures of the Mother Goddess show her giving birth in a squatting position, the only perfect position. Even now, in many countries, mothers deliver in a squatting position in the water. Such knowledge, therefore, appears to have been common in our ancient times.

Our ancient literature also contains many stories of unborn children who heard and learnt when they were still in the womb. Examples are *Abhimanyu, Prahalada* and *Ashtavakra*. The stories that our *puranas* tell us are all true. For, we now know, through medical evidence that the child can hear at the age of five and a half months of pregnancy. Birth is more miraculous than science can conceive. For example, the ovum knows which sperm cell to choose, out of millions of sperm cells!

The Story of *Ashtavakra*

Ashtavakra was a sage of ancient India. He was known to be a very intelligent and spiritually well advanced *rishi*. We learn about his birth and life from the Indian epic, *Ramayana*.

The story goes that sage *Uddalaka* was imparting Vedic knowledge in his ashram to a handful of disciples. *Kahoda* was one of his best students. *Uddalaka* was so pleased with him that he got his daughter *Sujata* married to him.

Eventually, *Sujata* conceived and, wanting her child to imbibe spirituality and intelligence, began to sit in the classes taught by *Uddalaka*.

The child in the womb heard the mantras that were chanted. One day, as *Kahoda* recited the *Vedas*, he made some mistakes in pronunciation. The child in the womb was already aware of the correct pronunciation of every syllable since its mother used to listen to *Uddalaka*'s classes with rapt attention. Whenever *Kahoda* pronounced a syllable wrong, the child in the womb squirmed in distress. *Sujata*, guessing the reason for the child's unrest, told *Kahoda* that he had pronounced a syllable wrongly whenever the child in the womb indicated so. This happened on eight occasions. *Kahoda*, considering it arrogance on the part of something yet to manifest itself in the world to advice him, cursed the foetus to be disfigured in eight places.

11The article is based on Dr Shamantakamani Narendran's presentation at the seminar, *Into the future with knowledge from our past'*, held in Bangalore on August 29 and 30, 2008 and information available in public domain on the web.

Today research is going on about how, when the foetus sleeps, it helps in its learning. Sleep is important for its learning, memory, neuro-development. For the foetus calmness and listening to good things is important. Delivery has become fearful, filled with anxiety, a stressful event, particularly with women having to multi-task, managing their homes and their careers. They have no time to read to the growing child inside them. We have no time to teach our children ethical lessons when they are still in the womb. There is no recognition of the need for a mother's spiritual IQ either. No wonder our ancient wisdom wanted pregnancy period to be so peaceful, so calm. They knew that when the mother is calm the child is calm.

David Barker, renowned epidemiologist[12], has found in his research on pregnant women that when the mother has not allowed herself to relax, the child too is stressed and refuses to grow. During foetus development each cell works for the welfare of the whole system.

Yoga for the care of the unborn child

Yoga is multi-dimensional. It has physical, mental, emotional and intellectual dimensions. That is why it provides total answer to the challenge of stress. Yoga is the skill to calm down the mind.

Sage *Aurobindo* has said that yoga is a technique for total personality development at physical, mental, emotional, spiritual levels.

Maharshi Patanjali has said that yoga is a science of mind and helps to control mind, desire and reaction to stress. It is a skilful rather than a brutal, mechanical technique.

The *Bhagavad Gita* says 'Yoga is the ability to maintain inner peace at all times, calmness in action is the secret.

During the first trimester we start teaching expectant mothers *asana* and *pranayama.* The *asana* and *pranayama* make the mothers restful and eliminate stress in them. Some of the adverse effects of stress are pregnancy induced hypertension, diabetes, abortion, preterm labour (less than 38 weeks), eclampsia (high blood pressure etc.) and IUGR [Intrauterine growth restriction - a term for a baby who is smaller than normal during pregnancy].

During the second trimester, there is quickening, foetus can hear, uterine size enlarges and the foetal parts are felt. During the third trimester one can hear foetal heart sounds, all systems are maturing and there is increasing discomfort for the mother. Yoga practices that have been taught ensure a good birth weight, prevent caesarian and preterm delivery.

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12 An epidemiologistepidemiologistepidemiologist is a person who studies patterns of diseases or health risks in population groups, societies, and cultures.

The mother should also practice *Yama* and *Niyama*. Our *rishis* did not ban sexual desires, but asked us practice it according to *dharma*. The expectant mother should first practice the Don'ts and then the Dos.

Yama* & *Niyama* - Part of the Eight Fold Yoga Path of *Patanjali

***Yama*: Precepts of Social Discipline**

Ahimsa -- Non-violence. Not harming other people or other sentient beings. Not harming onesself. Not harming the environment. Tolerance even for that which we dislike. Not speaking that which, even though truthful, would injure others.

Satya -- Truthfulness. Note that sometimes we may know our words are literally true, but do not convey what we know to be truthful. This is a child's game. Satya means not intending to deceive others in our thoughts, as well as our words and actions.

A*steya* -- Non-stealing. Not taking that which is not given.

Brahmacarya -- Sexual responsibility. Regarding others as human beings rather than as male and female bodies. The spirit of this precept is conservation of energy for the purpose of spiritual practice. This includes not only sexual restraint, but protecting our energy for instance by avoiding endless chattering with no clear purpose.

Aparigraha -- Abstention from greed. Not coveting that which is not ours. Avoidance of unnecessary acquisition of objects not essential to maintaining life or spiritual study.

Niyama: Precepts of Invididual Discipline

Sauca -- Cleanliness. Not only external cleanliness of the body, but attending to internal cleanliness such as avoiding the impurities of anger and egoism. Moderation in diet.

Santosa -- Contentment. Not spiritual complacency, but acceptance of the external situation we are allotted in this life.

The concept of pre-natal pregnancy care existed even in Vedic times. The rules they prescribe are known as *garbha samskaras.* The mother is advised to do prayer, *Japa* (meditating on an auspicious or divine object) and sing or listen to devotional songs that are soothing in nature. There is power in prayer which makes the mother focus on one point. We should develop our softer emotions, we should cry, love, be compassionate and be understanding.

All the time we are trying to prove what we are not. We are not natural. Therefore go into 'thought-free' mode in meditation. This will store in you powerful energy.

Integrated Approach of Yoga (IAY)

Nowadays yoga is so predominant; it has become so powerful all over the world, even in western countries there are so many schools, yoga clinics teaching various types of yoga – new born yoga, pregnancy yoga, *nada* yoga and so many others. But at the very outset I must say that unless you know the background, the spiritual concept of yoga, this teaching of a few *asana* postures, a few p*ranayama* exercises is not going to be useful.

I would like to clearly state that the benefits of yoga I am talking about are based on the scientific research project we did using the integrated yoga approach, with a strict, controlled group.

The IAY approach recommends the following exercises and relaxation techniques. These increase the expectant mother's threshold of pain and equip her with mental strength.

Breathing Exercises – Ankle Stretch, Hands in & out, Tiger stretch and side stretch

Loosening Exercises – Backward bending and forward bending

Asanas: Sitting postures – *Vajrasana*, *Ardha matsyendrasana*, *Badha Konasana*, squatting, *Upavishta Konasana*, and *sashankasana.*

Asanas: Supine Postures – *Viparita karani* and *Viparita Karani* with wall support

P*ranayama: Nadi Shuddhi* and *Padmasana*

Relaxation techniques:

- Instant relaxation technique
- Deep relaxation technique
- *Shavasana* in left lateral position

Meditation – *Omkar* meditation and *Mudra.*

I would like to conclude my talk by stating that my research on 'Efficacy of Yoga on Pregnancy Outcome' has shown marked benefits to the mother and the foetus.

The finding, a summary of which is given below, was published in the following papers:

- Efficacy of yoga in pregnant women with abnormal Doppler study of umbilical and uterine arteries. J Indian Med Assoc. 2005 Jan;103(1):12-4, 16-7.
- Efficacy of yoga on pregnancy outcome. J Altern Complement Med. 2005, Apr;11(2):237-44.

Summary of Research Findings

OBJECTIVE: To study the efficacy of yoga on pregnancy outcomes.

DESIGN AND SETTING: Three hundred thirty five (335) women attending the antenatal clinic at Gunasheela Surgical and Maternity Hospital in Bangalore, India, were enrolled between 18 and 20 weeks of pregnancy in a prospective, matched, observational study; 169 women in the yoga group and 166 women in the control group.

METHODS: Women were matched for age, parity, body weight, and Doppler velocimetry scores of umbilical and uterine arteries. Yoga practices, including physical postures, breathing, and meditation were practiced by the yoga group one hour daily, from the date of entry into the study until delivery. The control group walked 30 minutes twice a day (standard obstetric advice) during the study period. Compliance in both groups was ensured by frequent telephone calls and strict maintenance of an activity diary.

MAIN OUTCOMES: In babies the birth-weight is significantly higher in the Yoga group (2.78 +/- 0.52 kg), compared to the control group (2.55 +/- 0.52 kg). Occurrence of complications of pregnancy (pregnancy-induced hypertension, intrauterine growth retardation, pre-term delivery) shows lower trends in yoga group.

RESULTS: The number of babies with birth weight > or = 2500 grams was significantly higher in the yoga group. Preterm labor was significantly lower in the yoga group. Complications such as isolated intrauterine growth retardation (IUGR) and pregnancy-induced hypertension (PIH) with associated IUGR were also significantly lower in the yoga group. There were no significant adverse effects noted in the yoga group.

CONCLUSIONS: An integrated approach to yoga during pregnancy is safe. It improves birth weight, decreases preterm labor, and decreases IUGR either in isolation or associated with PIH, with no increased complications.

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TURMERIC – THE SALT OF THE ORIENT, THE SPICE OF LIFE AND THE MAGIC INGREDIENT OF THE INDIAN KITCHEN

Kamala Krishnaswamy[13]

Significance of traditional knowledge

I was always interested in traditional knowledge. Unfortunately I do not know Sanskrit language very well; in fact I hardly know it. All the same, I felt there is lot of knowledge in tradition, whether it is food habits, or traditional medicines like *Ayurveda* and *Siddha*. The knowledge in these has not been appropriately exposed to the world in the way that the scientific world wants. That is the reason many of them have gone into the background.

Turmeric, known as *Haridra* in Sanskrit, is an Asian spice labeled as poor man's saffron. It is predominantly used in India. It is not only known for its colour, aroma and taste, but is currently being researched vigorously for its preventive and therapeutic benefits throughout the world.

Our ancient people laid great stress on food habits and health, including public health. The *Rg Veda* states "you are what you eat", implying watch what you eat. A prayer in *Yajur Veda* says "Oh, God, Give us food which does not cause any disease and also gives us strength". The *Mahabharata* intones, "He, who takes food in proper measures, lives a long life and lives without disease, gets strength and alertness of mind. His children are born healthy and without any deformity or disease".

Why is Turmeric the Spice of Life?

With this introduction to what our ancients thought and said, let us take a closer look at Turmeric.

Whole turmeric as well as the extracted curcuminoids[14], appears to be active in many disease processes, with specific reference to chronic ailments such as cardiovascular, degenerative and inflammatory disorders as well as cancers. It may even prevent cataracts and delay the aging process in general.

Turmeric has several nutrients. Its many unique properties make the spice an ideal choice as a food flavour, as a colourant, preservative, medicinal agent and as a cosmetic. From time immemorial turmeric has its place in Indian systems of medicine as well as culinary arts. This simple, perennial

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13 The article is based on Dr Kamala Krishnaswamy's presentation at the seminar, *Into the future with knowledge from our past'*, held in Bangalore on August 29 and 30, 2008, her book of the same title published by Allied Publishers Pvt. Ltd. and information available in public domain on the web.

14Curcuminoids is a derivative of flavonoid group of compounds which helps in nitrogen fixation and it is not only useful to the plant itself but also for humans as well.

shrub with several varieties is now capturing the professional curiosity of nutritionists, food scientists, biologists, pharmacologists, pharmacists, medical scientists, oncologists, cardiologists, and others! Study of turmeric and its constituents is an inter disciplinary scientific effort, which has brought out its kaleidoscopic properties.

It has been scientifically established that Turmeric is a strong antimutagen[15], detoxificant, antioxidant,nanti inflammatory, anti cancer and tumouricidal agent. It is also a hypolipidaemic (used to lower blood cholesterol) agent.

Can there be any doubt that this ancient spice of India aptly deserves the epithet 'The salt of the orient, the spice of life'?

Turmeric's use in the modern context

In the modern context of designer foods and functional foods turmeric probably can occupy the pride of place for reducing the physical, chemical and biological ill effects on the body. Its uses as an antiseptic, anti-inflammatory compound, blood purifier, carminative, germicidal, cough medicine and as a deworming agent are well documented.

It protects and preserves food against spoilage and infestations. It also masks off flavour and protects against decomposition. The traditional practices are being translated into scientific parlance as preservative, antioxidant, and anti-inflammatory effects - which protect bio-molecules of not only food but also the molecules in the body, thereby preventing degenerative processes which result in chronic diseases.

Curcumin, the essential compound present in turmeric, protects against liver damage. It is believed to be converted into a choleretic compound thus supporting its historic use in treating liver and gall bladder disorders. It also lowers the cholesterol level.

Indian women have been using it for cosmetic purposes and today we can find a science based evidence for it. It is used as dye for dyeing wool, silk, cotton, in pharmacy, confectionery, rice milling and food industries. Its uses in paints and varnishes have also been reported.

Turmeric is largely used as a spice, as food additive with vegetables, meat, fish and snack items. It is used to flavour and colour butter, cheese, margarine, pickles, and mustard paste. In other countries it is used in cakes, table jellies and fruit drinks. It is used for colouring potato flakes,

15 A mutagen (Latin, literally *origin of change*) is a physical or chemical agent that changes the genetic information (usually DNA) of an organism and thus increases the frequency of mutations above the natural background level. As many mutations cause cancer, mutagens are typically also carcinogens.

soups, yoghurts and even ice creams! It improves the preserving quality of all items.

Wound healing

Tissue repair and wound healing are complex processes that involve inflammation, granuilation, and remodeling of tissues. An investigation into the beneficial effects of curcumin on wound healing demonstrated that there was a faster wound closure of punch wounds.

The Turmeric Issue – a bio piracy case

Turmeric is a tropical herb grown in East India, and the powdered product made from the rhizomes of its flowers has several popular uses worldwide. Turmeric powder, which has a distinctive deep yellow color and bitter taste, is used as a dye, a cooking ingredient, and litmus in a chemical test, and has medicinal uses as well. In the mid-1990s, this product became the subject of a patent dispute with important ramifications for international trade law. A U.S. patent on turmeric was awarded to the University of Mississippi Medical Center in 1995, specifically for the "use of turmeric in wound healing.".

Coronary heart disease

Atherosclerosis or hardening of arteries is the leading cause of death and disability in the developed countries, and in recent times, in the developing countries as well. It is a vascular disease and manifests as Coronary Heart Disease (CHD) such as angina and or myocardial infarction leading to sudden death or chronic disability. It can also lead to stroke or gangrene. It can even affect the kidneys.

The effects of curcumin / turmeric in mitigating some of these to protect against cardiovascular problems have been elaborated. The various effects of turmeric and curcumin, its extracts (aqueous and ethanolic) suggest that either a food based approach with plenty of turmeric (1-2 g, which would amount to a teaspoonful of powder as it is very light in weight) or curcumin (300-500 mg) as a chemo-preventive agent may reduce the risk of cardiovascular disorders.

Cancer

Cancer is a complex disease presenting diversity in all aspects. It differs in aetiology (study of causation), sites of occurrence, clinical presentation, pathogenesis (origin of a disease), progression, as well as therapeutic approaches and responses. Cancer is due to failure of the mechanisms that control growth and proliferation of cells.

Curcumin from turmeric has a plethora of beneficial biological functions and pleiotropic (widespread) effects on tumor initiation, promotion and progression. It has a wide sweep of complex molecular actions.

Turmeric and curcumin have been investigated for their chemo-preventive actions using several tumor models. The preventive effects are documented at several sites such as oral cavity, skin, lung, breast, gastrointestinal tract particularly stomach, colon, liver, and prostrate.

Dietary substances, such as the turmeric extracts, that inhibit formation of carcinogens are considered to be excellent blocking agents of chemical carcinogenesis, or those that decrease the binding of electrophilic substances with critical nucleophilic.

Carcinogen is a substance that is capable of causing cancer in humans or animals, or is known to promote or aggravate cancer, but not necessarily cause cancer. Cigarette smoke is a well established carcinogen and smoke condensates are known to damage DNA-damaging reactive oxygen species.

Conclusion

Food based approaches are best for prevention and/control of chronic diseases, and aggregate effects of spices in small doses (1-2g) may have sustainable beneficial effects. **A teaspoon of turmeric a day can keep cancers at bay.**

Man is a product of nature, nurture and nutrition. Therefore 'Eat well and Live well'. And always remember, dietary approaches for prevention of chronic diseases is cost effective, culturally acceptable and sustainable.

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NEED FOR THE ADVENT OF CALCULUS IN INDIA: A JOURNEY INTO THE 15TH CENTURY

K Ramasubramanian[16]

What is Calculus?

In this talk we are going to take into account contributions made by Indians, particularly mathematicians. Let me start with what we mean by Calculus. Calculus, essentially, is a study of infinity. The fundamental idea in calculus is to find out the change at any instantaneous moment. Suppose a car starts from your house and you come here, the speed continuously varies, and this varying speed at any instant is called the velocity. Calculus is studying change instantaneously.

Where do we use this? In the concept of differentiation, in the concept of integration. Any function can be represented as a sum of an infinite number of terms and that is what is very interesting about calculus. Now it is common for us to think in these terms, but It was considered a great discovery at one point of time. If we have something which is represented in terms of an infinite number of numbers, will we able to add them?

Suppose you want to know the value of some function and express it as a sum of infinite number of terms, how are you going to find out that value? There comes the notion of convergence, convergence of series and convergence in value. So, the moment I say infinite number of terms it contributes to something, the idea has to be clearly understood.

I am trying to enter some quantity, forget about what that quantity is, it is not important. I am expressing that quantity as a sum of infinite number of terms. The quantity I am going to enter here is a finite number, it is not infinity. So, I have in principle an infinite series, the contribution due to the infinite number of terms in the series should lead to a finite value. So, here the contribution of each of the infinite number of terms on the right hand side, which is going to give you the value of some function on the left hand side is going to be very, very, very small. The idea I am giving here is that you have to deal with things that are very, very, very small in nature. Only when we go to the infinitesimal we have infinite and from the infinite we go to infinitesimal.

16 The article is based on Dr Rmasubramanian's presentation at the seminar, *Into the future with knowledge from our past'*, held in Bangalore on August 29 and 30, 2008 and information available in public domain on the web.

Fear of Zero

In ancient India we had the concept Zero and Infinity: *Shunya* (शून्य) and *ananta* (अनंत). The essence of Calculus is the use of infinitesimals / limits.

However, there have been certain civilizations that were really worried about going to really small, small, small things, in fact zero. There is a book by Charles Seife which is called *'Zero: The Biography of a Dangerous Idea'*. Here is an extract from this book:

> "Greeks could not do this neat little mathematical trick. They didn't have the concept of a limit because they didn't believe in zero. The terms in the infinite series didn't have a limit or a destination; they seemed to get smaller and smaller without any particular end in sight. As a result the Greeks couldn't handle the infinite. They pondered the concept of void but rejected zero as a number, and they toyed with the concept of infinite but refused to allow infinity – numbers that are infinitely small and infinitely large – anywhere near the realm of numbers. This is the biggest failure in the Greek Mathematics, and it is the only thing that kept them from discovering calculus".

Now, let us see why they considered zero a dangerous idea.

When you are dealing with the physical world you are dealing with quantity, so what does zero mean?

To the ancients, particularly the Greeks, zero's mathematical properties were inexplicable, because zero is different from other numbers. Zero always misbehaves. At the very least it does not behave the way the other numbers do.

- Add any number to itself, and it changes (1 + 1 = 2)
- Zero refuses to get bigger. (0 + 0 = 0)!

This violates the basic principle of numbers called the Axiom of Archimedes[17], which says that if you add something to itself enough times, it will exceed any other number in magnitude.

- Zero also refuses to make any other number bigger
- Normally multiplication by a number stretches a number line. But multiplication by zero collapses it!
- Dividing by zero destroys the entire framework of mathematics; it would clash with the fundamental philosophy of the west.

17 Archimedes of Syracuse (c. 287 BC – c. 212 BC) was a Greek mathematician, physicist, engineer, inventor, and astronomer. Although few details of his life are known, he is regarded as one of the leading scientists in classical antiquity -Wikipedia

The Infinitesimal and Infinity

This being the scenario in the Greek tradition, it is interesting to contrast it with the Indian tradition.

- The dexterity with which the Indians could comprehend such concepts is evident from the *Shanti-Mantra* of the *Isavasyopanishad*[18] - ईशावास्योपनिषद्, that states as follows:

  पूर्णमदः पूर्णमिदं पूर्णाद् पूर्णमुदच्यते ।

  पूर्णस्य पूर्णमादाय पूर्णमेवावशिष्यते ||

  purnamadah puranamidam purnaad purnamudachyate |

  purnasya purnamaadaaya purnamevaavashishyate ||

  When *Purna* - पूर्ण is taken out of *Purna* what remains is also *Purna*.

- The notion of *Shunya* appears in *Chandas Sutra*[19] - छंदस् सूत्र (300 BCE). *Brahmagupta* talking about the mathematics of zero observes:

  धर्नर्णयोर्धनं ऋणमृणयोः धनर्णयोरंतरं स्मैक्यम् ।

  ऋणमैक्यं च धनमृणधनशून्ययोः शून्यम् ॥

  Dharnarnayordhanam runamrunayoh
  dhanarnayorantharam samaikyam |

  runamaikyam cha dhanamrunadhanashunyayoh shunyam
  ||

- The notion of infinity, which is so fundamental for the development of calculus along with the notion of infinitesimal, is presented by *Bhaskara*[20] in his *Bijaganita*:

18This *Upanishad*, which is the smallest, is the end part of *Shukla Yajurveda (vajasneya samhita)*, consists only 18 Slokas. Wikipedia

19Pingala was an ancient Indian writer, famous for his work, the Chandas Shastra (also *Chandas Sutra*), a Sanskrit treatise on prosody considered one of the Vedanga. He developed advanced mathematical concepts for describing the patterns of prosody -Wikipedia

20*Bhaskara II* was born in 1114 CE, in *Biddur*, India died 1185 CE, probably in *Ujjain*. Also called *Bhaskaracarya*, or *Bhaskara* The Learned. He was the leading mathematician of the 12th century, who wrote the first work with full and systematic use of the decimal number system. *Bhaskara II* was the lineal successor of the noted Indian mathematician *Brahmagupta* (598–*c.* 665) as head of an astronomical observatory at *Ujjain*, the leading mathematical centre of ancient India – Encyclopedia Britannica.

अस्मिन् विकारः खहरे न राशौ अपि प्रविष्टेष्वपि निःसृतेषु ।

बहुष्वपि स्यात् लयसृष्टिकाले अनन्तेऽच्युते भूतगणेषु यद्वत् ॥

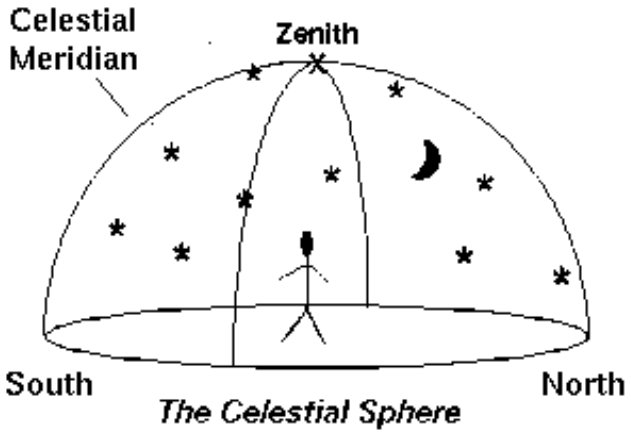
asmin vikaarah khahare na raashau api pravishteshvapi nisruteshu |

bahushvapi syaat layasrushti kaale anante achyute bhuta ganeshu yadvat ||

\In this quantity that has zero as the divisor (*khahara*) there is no change, even if very large quantities [numbers of huge magnitudes] are inserted or extracted; as no change takes place in the infinite (*ananta*) immutable (*acyuta*) [*Brahman*] at the time of destruction or creation of the worlds when numerous beings are absorbed and put forth.

KERALA MATHEMATICIANS

As we do now, so in the distant past great thinkers of all the civilizations – Hindu, Greek, Arabic, Chinese, etc. – wondered how to interpret the celestial phenomena.



The Celestial Sphere

One of the celestial phenomena they were concerned about was the eclipse. When is it going to occur, how long will it happen? This involved the study of instantaneous velocity of the earth and the moon.

To study this velocity they needed a fixed frame of reference, and the 27 stars in the sky were the fixed reference. These great thinkers were not the persons who carried on with their work stating some serpent ate away the moon!

In fact, in India *Apara* or the worldly knowledge body, emanating from the *Vedas* consisted of a branch called *Jyotisham*, which means study of objects

that are emitting light. So, *Jyotisham* was a scientific study of the celestial bodies, and not what it has come to mean today.

In this context, I will just say that great work has been done by our ancient Kerala mathematicians such as *Madhava* and *Nilakantha* in the areas of:

- Infinite series expansion of trigonometric functions
- Infinite series for π
- The derivative of the Sine inverse function

Nilakantha's[21] discussion of irrationality of π

You all know what a rational number is - that which can be expressed as a ratio – ratio of some physical quantity, and an irrational number is one that cannot be expressed as a ratio. Now let us consider π. What is it? It is the ratio of circumference to the diameter of a circle, which is constant irrespective of the size of the circle.

Is π a rational number or irrational number? You know it is an irrational number. Why am I worried about such a number at all? In the Indian context we can say that it was required to construct *homa kunda* – the sacrificial altar. These had to be constructed in different shapes - a square, a circle, and all had to be precisely of the same area. Neelakantha, a 15th Century Kerala Mathematician was interested in π . He wanted to know how to find the sum of an infinite series. There must be a way to say, this is where the infinite series is going to converge.

While discussing the value of π, *Nılakantha* observes:

परिधिव्यासयोः सङ्ख्या सम्भन्धः प्रदर्शितः ।

आसन्नः आसन्नतयैव अयुतद्वयसङ्ख्यविष्कंभस्य इयं ।

परिधिसङ्ख्या उक्ता । कुतः पुनः वास्तवीं सङ्ख्यां उत्सृज्य

आसन्नैव इवोक्ता ? उच्यते । तस्या वक्तुम् अशक्यत्वात् । कुतः ?

Paridhivyaasayoh sankhyaa sambandhah pradarshitah |

Aasannah aasannatayaiva ayutadvaya samkhyaa vishkambhasya iyam |

[21] Nilakantha Somayaji (1444-1544), from Kerala, was a major Indian mathematician and astronomer of the Kerala School of astronomy and mathematics and was a student of *Damodara*. Among his many influential books, he wrote the comprehensive astronomical treatise *Tantrasamgraha* in 1501. He also wrote the *Aryabhatiya Bhasya*, which contains work on infinite series expansions, problems of algebra, spherical geometry, and many results of calculus. *Grahapareeksakrama* is a manual on making observations in astronomy based on instruments of the time.

Paridhi samkhyaa uktaa | kutah punah vaastaveem samkhyaa utsrujaya?

Aasannaiva ivoktaa ? uchyate | tasyaa vaktum ashakyatvaat | kutah?

The relation between the circumference and the diameter was expressed in approximate terms. This value (62,832) was stated to be nearly the circumference of a circle having a diameter of 20,000. "Why then has an approximate value been mentioned here leaving behind the actual value?" It is explained [as follows]. Because, it (the exact value) cannot be expressed. Why?

येन मानेन मीयमानो व्यासः निरवयवः स्य्यात् तेनैव मीयमानः परिधिः पुनः सावयव एव स्यात् ।

एन च मीयमानः परिधिः निरवयवः तेनैव मीयमानो व्यासोपि सावयव एव इति एकेनैव मीयमानयोः उभयोः क्वपि न निरवयवत्वं स्यात् ।

ena maanena meeyamaano vyaasah niravayavah syaat tenaiva meeyamaanah paridhih punah saavayava eva syaat

ena cha meeyamaanah paridhih niravayavah tenaiva meeyamaano vyaasopi saavayava eva ithi ekenaiva meeyamaanayoh ubhayoh kvapi na niravayavatvam syaat |

Given a certain unit of measurement (*maana*) in terms of which the diameter (*vyaasa*) specified [is just an integer and] has no [fractional] part *(niravayava*), the same measure when employed to specify the circumference (*paridhi)* will certainly have a [fractional] part (*saavayava*) [and cannot be just an integer]. Again if in terms of certain [other] measure the circumference has no [fractional] part, then employing the same measure the diameter will certainly have a [fractional] part [and cannot be an integer]. Thus when both [the diameter and the circumference] are measured by the same unit, they cannot both be specified [as integers] without [fractional] parts.

महान्तम् अध्वानम् गत्वापि अल्पावयवत्वम् एव लभ्यम् ।

निरवयवत्वम् तु क्वपि न लभ्यम् इति भावः ॥

mahaantam adhvaanam gatvaapi alpaavayavatvam eva labhyam |

niravayavatvam tu kvapi na labhyam iti bhaavah ||

Even if you go a long way [i.e., keep on reducing the measure of the unit employed], the fractional part [in specifying one of them] will only become very small. A situation in which there will be no [fractional] part [i.e., both the diameter and circumference can be specified in terms of integers] is impossible, and this is what is the import [of the expression *aasanna*]

What *Nilakantha* is trying to explain is the incommensurability of the circumference and the diameter of a circle. The last line of the above quote – "however small you may choose your unit of measurement to be, the two quantities will never become commensurate" – is indeed noteworthy.

Conclusion

It is clear that major discoveries in the foundations of calculus, mathematical analysis, etc., did take place in Kerala School (14-16 century). Besides arriving at the infinite series, that the Kerala astronomers could manipulate with them to obtain several forms of rapidly convergent series is indeed remarkable. While the procedure by which they arrived at many of these results is evident, there are still certain grey areas (derivative of sine inverse function, ratio of two functions). Many of these achievements are attributed to *Madhava*, who lived in the 14th century. Unfortunately, we don't know much about his works. Whether some of these results came to be known to the European mathematicians is matter of conjuncture.

In this talk I have not discussed mathematical equations in detail, as this is a general audience. I have briefly mentioned some mathematical problems that our ancient mathematicians were very much interested in. If you go back remembering the names of *Nilakantha* and *Madhava,* the purpose this talk will have been served.

Madhava

Mādhava of *Sangamagrama* (born as *Irinjaatappilly Madhavan Namboodiri*) (c.1350–c.1425) was a prominent Hindu mathematician-astronomer from the town of *Irinjalakkuda*, near Cochin, Kerala, India, which was at the time known as *Sangamagrama* (lit. *sangama* = union, *grāma*=village). He is considered the founder of the Kerala School of astronomy and mathematics. He is the first to have developed infinite series approximations for a range of trigonometric functions, which has been called the "decisive step onward from the finite procedures of ancient mathematics to treat their limit-passage to infinity". His discoveries opened the doors to what has today come to be known as mathematical analysis. One of the greatest mathematician-astronomers of the middle Ages, *Madhava* contributed to infinite series, calculus, trigonometry, geometry and algebra.

Some scholars have also suggested that Madhava's work, through the writings of the Kerala School, may have been transmitted to Europe via Jesuit missionaries and traders who were active around the ancient port of Kochi at the time. As a result, it may have had an influence on later European developments in analysis and calculus. - Wikipedia

SACRED GROVES AND BIO DIVERSITY

A N Yellappa Reddy[22]

I would like to share my views on the topic of '*Sacred Groves and Bio Diversity*' as a forester with field experience.

Let me begin by recounting an incident. Very recently, a girl from Switzerland came to India and was going round Bangalore city. She went around Bangalore for about two months and then came to me with photos of flyovers and several photos of uprooted trees and asked, "Sir, which one do you prefer – flyovers or trees?" Even though I have been a forester all my working life, I had never seen trees photographed in that manner, with all their roots exposed. For four hundred long years some of those trees had been serving earth's creatures. Imagine the amount of food security, the amount of bio diversity it has provided. The total quantity of service one tree has offered - the life capital, from the day it started sprouting four hundred years ago - if we calculate in dollar terms, it will probably be more than all the money the World Bank has!

I would like to recount a story, a conversation between an ordinary cobbler – a simple soul - and the most learned sage, Narada Maharshi.

Once, Narada came to the cobbler's humble home under a *vatavruksha* [Banyan tree] and said, "I have just come from Vaikuntha, the abode of Lord Narayana. He told me you're a great scholar and asked me to inform you that he has just inserted a huge elephant in the eye of a needle."

The cobbler replied, "I neither know Vaikuntha nor Narayana," and continued with his work.

Narada, who had expected the cobbler to show some surprise at the news of an elephant being passed through the eye of a needle, persisted. "I said that Lord Narayana has inserted a huge elephant into the eye of a needle. Aren't you surprised? Do you think such a thing is possible?" he asked.

The cobbler said, without a hint of doubt, "Of course, why not?"

Surprised by the cobbler's reaction or the lack of it rather, Narada asked, "How do you say such a thing is possible?"

The cobbler picked a fruit of the *vatavruksha* and squeezed it open. From among the five hundred or so seeds inside the fruit, he picked one tiny seed. Showing the seed to the sage, the cobbler said, "If this big tree, which is a hundred times the size of your elephant, can come out of this small seed, then can't an elephant pass through the eye of a needle?"

The simple cobbler had just taught the learned sage a great philosophy.

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[22] The article is based on Sri Yellappa Reddy's presentation at the seminar, *Into the future with knowledge from our past'*, held in Bangalore on August 29 and 30, 2008 and information available in public domain on the web.

Like the cobbler, we too must learn to see the miracle present in every seed of every fruit of every tree and remember the amount of food security and diversity that we get from a single tree, for many long years, as long as it lives.

A tree which can provide everything to some form of life is called a Keystone species. It provides food, habitat, security, health, everything.

A keystone[23] niche is a habitat where all the keystone species survive with excellent care.

The Banyan is a keystone species. It has a particularly unique relationship with wasps. The flowers of the Banyan tree are fully equipped, like a modern maternity hospital, to provide complete care for the wasp – from the stage of eggs till it hatches and flies off to another home. In return, all the Banyan tree asks is that the wasp carries with it some of its pollen grains. Without wasps the Banyan tree cannot survive. Wasps alone can pollinate them. And wasps need the Banyan tree to cultivate their nurseries! What an amazing, symbiotic relationship! Do we think of this when we cut down a tree? In the story of the cobbler and Narada, the cobbler had a sense of awe, a sense of wonder for his environment, which we in this age of science and technology have lost.

Another great soul who realized that Brahman – the Absolute Reality - is there in everything is Savitri. You all know the story how when Lord Yama took away the life of her husband and she had no one to help her, she sought the help of a *vatavruksha.* The story symbolically mentions that the *vatavrusksha* is the sole companion required to fight even the Lord of Death. To this day, the *vatavruksha vrata* (austerity) continues to be observed in parts of India.

The world of biodiversity is a beautiful manifestation of Brahman. The bio diversity of this earth encompasses every individual tree and and every individual tuber that grows below the earth. All these have a purpose. Without them our planet cannot survive. Still man in his arrogance undermines all these biological functions required to maintain life. It is biodiversity that can set right the man made ailments that affect our mother earth. Biodiversity plays a vital role in pollination, fertilization and reproduction.

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[23] A keystone species is a species that has a disproportionate effect on its environment relative to its abundance. Such species affect many other organisms in an ecosystem and help to determine the types and numbers of various others species in a community.

Such an organism plays a role in its ecosystem that is analogous to the role of a keystone in an arch. While the keystone feels the least pressure of any of the stones in an arch, the arch still collapses without it. Similarly, an ecosystem may experience a dramatic shift if a keystone species is removed, even though that species was a small part of the ecosystem by measures of biomass or productivity. It has become a very popular concept in conservation biology. -Wikipedia

Most of you must have read in the papers, some six months back, about a woman who was harbouring 650 beehives in a barren plot, 24 ft by 280 ft, near Bangalore International Airport. Bees can travel 37 kms and pollinate. The sunflowers grown in the nearby fields pollinated by the bees were far superior to the other sunflowers. The seeds were bigger and had more oil content, attributable to only one single factor that is pollination by the bees. The Government of Karnataka declared the same area as Technical Zone and to cut all trees. If you calculate in terms of money the job done by 70 to 80 varieties of bees and compare it with the supposed economic benefits derived from these zones, you will realize how faulty our argument of economic growth is, to achieve which we harm mother earth irretrievably. Is this what our development agenda is all about?

A few years back I went to a dam that was being constructed to assess its impact. The chief engineer was complaining about the wild grass (macro algae) present in the water, saying they drink up all the water! He did not know that Macro Algae mass produce oxygen by way of photosynthesis.

Green plants conduct photosynthesis to make their food, and oxygen is a by-product of this process. Dissolved oxygen levels may rise from morning through the afternoon as a result of photosynthesis, reaching a peak in late afternoon. Bacteria and eukaryotic organisms (algae, fish) consume this oxygen through respiration. The result of these two mechanisms determines the concentration of dissolved oxygen, which in turn indicates the production of biomass. Rivers with high dissolved oxygen content are usually stable ecosystems capable of supporting many different kinds of plants and animals. Some animals such as mayflies, stone flies, caddis fly, and aquatic beetles, require high dissolved oxygen content to survive. Worms and fly larvae, which can survive in low dissolved oxygen rivers, are indicators of an unhealthy river.

I asked the engineer to taste water near the wild grass and some water where there was no grass. He soon realized that the tastes were very different.

In our engineering colleges, when they teach civil engineering, they don't seem to take note of even the basic things about our environment. The engineer said, in fact, “Sir, I'm guilty of bringing AIDS-like disease to about 35,000 acres of land, during my career without thought for the damage I was causing. I have made so much of earth lifeless!”

I must also tell you about the good turn the concern for our environment is taking today. A bio diversity park has been set up for the Bangalore University at the JnanaBharathi campus. The entire park is due to the effort of the loving labour of 7000 college students – girl students. They would get up every morning at 4 am and come to the park to water the plants and nurture them. Today there are about 350 plants species in this park. It includes the *Charaka-Shushruta vana, Pancha-Valkala Vruksha Dhama* (five bark bearing trees), bonsai garden and aroma park. The bio-diversity park has about three lakh saplings including many rare and endangered species.

I am happy to say that this bio diversity park, in whose development young students were actively involved, is the pride of Bangalore.

Albert Einstein said that the Self is pervading in all creations and understanding the Self in all creations is the essence of knowledge. We must realize that protection of biodiversity is the domain of both science and culture.

Remember, a *vatavruksha* that harbours about 350 beehives is a heritage centre, as defined in the world heritage parameters. There are about 100 such heritage centres in and around Bangalore; not man made, but provided by Nature.

The Sacred Groves of India

Green patches of woodland dot the landscape of India — from bamboo groves on the eastern coast to clumps of trees in the northwestern deserts, and from jungles in the tropical south to dense Himalayan forests in the north. Like the Indian population itself, these forests are tremendously diverse, but they share an important commonality: they are all held sacred.

Sacred Groves, or *devara kaadu* is the in situ conservation of endemic species. We don't know how they did it, or why they did it, but our ancestors talked about *Sthala Vruksha, Kula Vruksha, Gundu Thopu*....

The Peepul tree at the centre of the village - *Ashvattha katte* - was the lung of the village; the pond – *Kere* - was the kidney of the village as it filtered water. Our elders had designated about 15,000 species as *Kula Vruksha* – to be protected by one family each.

Like many countries throughout the world, India has a long history of Nature worship, and that practice continues today, especially through the veneration of forest groves. These sacred groves, which are dedicated to local deities or ancestral spirits, are protected by local communities through social traditions and taboos that incorporate spiritual and ecological values.

Preserved over the course of many generations, sacred groves represent native vegetation in a natural or near-natural state and thus are rich in biodiversity and harbour many rare species of plants and animals. The forces of the modern world are depleting sacred groves and weakening the traditions that protect them. Fortunately, thousands of sacred groves remain and many villages continue to observe traditional practices. Moreover, in the face of degradation, conservationists and local communities are recognizing that traditional knowledge and sacred practice are important elements in the conservation and management of these ecological treasures.

Sacred groves are often the last refuge for endemic and endangered plant and animal species. They are storehouses of medicinal plants valuable to village communities as well as modern pharmacopoeia, and they contain wild relatives of crop species that can help to improve cultivated varieties. Sacred groves also provide for the water needs of nearby communities. Many

sacred groves contain water resources such as ponds and streams, and the vegetative mass that covers the floor of a grove can absorb water during rainy seasons and release it during times of drought. Trees also improve soil stability, prevent topsoil erosion and provide irrigation for agriculture in drier climates.

There has been no comprehensive survey of sacred groves in India, so their exact number and area are unknown. At least 13,720 sacred groves have been reported in various regions of the country. Of these, Karnataka is reported to have 1424 sacred groves. Kodagu district has the distinction of having more than 950 sacred groves, covering over 250 acres. In old Mysore, about a hundred years ago, a census of sacred groves was taken and it was found that there were about 16,000 sacred groves in the 12,000 villages!

The existence of sacred groves in India most likely dates back to an ancient pre-agrarian hunter-gathering era, and their presence has been documented since the early 1800s. Believing trees to be the abode of gods and ancestral spirits, many communities set aside sanctified areas of forest and established rules and customs to ensure their protection. These rules varied from grove to grove but often prohibited the felling of trees, the collection of any material from the forest floor, and the killing of animals. Presiding deities, it was the belief, would administer punishment, often death, to individuals who violated the rules, and sometimes to the entire community in the form of disease or crop failure. As a result of these protective restrictions, preserved over countless years, sacred groves are now important reservoirs of biodiversity.

Hindu mythology prescribes *vratas* i. e. ritual performances for respective deities like *Ganapati vrata*, *Lakshmi vrata* and *Nitya Somavara vrata*. These *vratas* need to be performed by using specific plant species. An interesting compilation by the Karnataka Forest Department describes 19 *vratas* and more than 100 plant species required for these.

The concept of Sacred Groves is not only the cultural ethos of the community, but also denotes the effective bond between people and environment. It highlights the respect they had for all forms of life. According to a member of the Bishnois of Rajasthan, a tribe with a conservation-based religious faith so strong that some have sacrificed their lives to save sacred trees: "Any change in the world has to begin within the society. All this talk about Nature and wildlife protection would be more effective if each individual was to believe in the earth as a living, breathing entity and fight for its survival the way we do."

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PRANAYAMA -THE BREATH OF LIFE

***Pranav Rao*[24]**

Pranayama is the fourth 'limb' of the eight limbs of *Raja Yoga* mentioned in verse 2.29 in the *Yoga Sutras* of Patanjali. He refers to *pranayama* as the control of life force that comes as a *result* of practicing the various breathing techniques.

The Eight Limbs of yoga practice are:

(1) Yama (The five "abstentions"): violence, lying, theft, illicit desires, and possessions

(2) Niyama (The five "observances"): purity, contentment, austerities, study, and surrender to God.

(3) Asana: Literally means "seat", and in Patanjali's Sutras refers to seated positions used for meditation. Later, with the rise of Hatha yoga, asana came to refer to all the "postures".

(4) Pranayama ("Life Force Control"): Control of prāna, life force, or vital energy, particularly, the breath

(5) Pratyahara ("Abstraction"): Reversal of the sense organs (Pratyahara is the fifth element among the Eight stages of Patanjali's Ashtanga Yoga. At this stage, the consciousness of the individual is internalized in order that the sensations from the senses of taste, touch, sight, hearing and smell don't reach their respective centers in the brain. With this, the Sadhaka, or disciple, is free to meditate without distractions.)

(6) Dharana ("Concentration"): Fixing the attention on a single object.

(7) Dhyana ("Meditation"): Intense contemplation of the nature of the object of meditation.

(8) Samadhi ("Liberation"): merging consciousness with the object of meditation.

Before we understand the overall effects of *pranayama* on the general body, four *pranayama* practices are examined for their effects on the brain or other parts of the human body. I have selected these practices on the basis of their importance in the practice of yoga and their stated influence on the physiological and psychic bodies.

[24] Pranav Rao was the VTT Scholar for the year 2006-07. He was studying in the tenth standard. This article is based on the paper he submitted as required by the terms of the scholarship.

1.Kapalbhati

(Exhale through both nostrils, contracting the middle and lower abdomen portions. Release the contractions quickly and immediately follow with another forceful exhalation . Inhale passively and effortlessly.)

- Van Lysbeth states that *kapalbhati* influences the circulation of blood within the brain.
- The capillaries are opened up and the brain cells related to the pineal and pituitary glands (master gland) receive significant stimulation. (Melatonin is produced by the pineal gland .This regulates the physiological functions that occur in the body within a 24-hour period, such as sleep-wake cycles, fluctuations in body temperature, heart rate, and blood pressure)
- Van Lysbeth supports this conclusion as follows: "Together with the acceleration of the blood circulation in the whole body, this stimulation of the brain and thereby of the central nervous system produces the special 'relation' of the body that invigorates and tonifies each cell".
- *Kapalbhati* reduces the ratio of the outward breath to the inward breath to one quarter. This in turn increases the breath control, stretching it to the limit, and dramatically affects the carbon dioxide, chemical, acid and alkalis in the blood. Carbon dioxide is the trigger for inhalation of breath into the lungs and the body and, therefore, the body is very sensitive to carbon dioxide levels.

2.Kumbhaka

(The breath is retained on the inhalation, not by a hard closing of the throat or 'holding' of the breath, but rather by making of yourself a spacious and empty vessel for the breath, in which the breath is quiet, suspended and motionless, like air in an empty pot. It describes a moment of suspension of the breath in which the prana pauses, whether inside the body or out, before 'turning around' and continuing its movement as the breath.)

- *Kumbhaka*, practiced over a duration of time, will allow the body to retain carbon dioxide and become accustomed to reduced oxygen levels to achieve hypometabolism, that is, a slowing down of the metabolic rate (the least amount of energy necessary to maintain the vital involuntary activities, including breathing, maintenance of heat, heartbeat and blood circulation, and the activities of the nervous system and internal organs)
- *Kumbhaka* stops vital body rhythms and affects the brain waves. Control of the brain waves is the key to controlling all brain rhythms (The brain consists of numerous neurons firing at different rates at different times in response to a variety of internal and external stimuli. The summed activity of all these neurons can be measured through the electroencephalogram.).
- While the effects of external *kumbhaka* are many, in broad terms, the body and mind learn to stay calm under stress.

3. Nadi shodhana

(Close the right nostril with the right thumb. Now inhale slowly through the left nostril and fill your lungs. After complete inhalation, press the left nostril with the ring finger of the right hand and close the left nostril. Open the right nostril, exhale slowly. After complete exhalation, again inhale through

the right nostril and fill your lungs. Close the right nostril by pressing it with the right thumb. After opening the left nostril, breathe out slowly. This process is one round of *Nadi Shudhi Pranayama*.)

- *Nadi shodhana* is the 'perfect balancing practice' which stimulates equally the left and right sides of the brain and body.
- *Nadi shodhana* imposes a rhythm on the brain, over the irregular state that normally exists. Modern living has removed the regular rhythms of nature from the human body and nadi shodhana assists in bringing the body and mental activity into balance.
- Research has shown that *nadi shodhana* affects the brainwaves by superimposing a regular sine wave over the normal irregular brain activity, imposing a discipline on the irregularities of the mental process and, eventually, the autonomous body rhythms.

4. Ujjayi

(In *Ujjayi*, or the psychic breath, the lungs are fully expanded, and while exhalation a grunt is produced by a slight contraction of the throat.)

This has a subtle effect on brain activity via four processes:

- *Ujjayi* increases the pressure of air in the lungs and expands the effective use of the lungs. This ensures transfer of oxygen to each cell within the lungs, rather than a significantly smaller percentage used during normal respiration.
- Increased oxygen transfer in the lungs enhances blood flow throughout the body, while the body is in a relaxed state. The effect is similar to that achieved when the body is physically active, with the advantage of the whole body being in a relaxed state.
- Conscious awareness is transferred into the unconscious mind which affects the nervous system governing respiration. A smooth rhythm is exerted on the nervous system that has a profound effect at the psychic level of the mind.
- The contraction of the throat caused by *ujjayi* affects the carotid sinuses (**carotid** is a major artery of the head and neck that helps supply blood to the brain- **sinus** is a sac or cavity in any organ.) which regulate blood pressure in the arteries. Ujjayi exerts a slight pressure on the carotid sinuses which, over time, lowers the blood pressure, which leads to reduced tension and slows the thought processes of the mind.

Effect of Pranayama on various systems

1. The Brain:

- Modern science states that there are ten areas of the brain of which we are using only one at our present stage of evolution. The subconscious mind and its relationship to the conscious mind are dealt with in pranayama by the establishment of an interface between the conscious and the subconscious minds in the area of the brain called the reticular activating system (RAS) – (a part of the reticular formation that controls the degree of activity of the central nervous system as in maintaining sleep and wakefulness and in making transitions between the two states)
- The RAS is like a trigger for other parts of the brain. Man is able to affect the RAS through the breath only. No other function of the autonomic nervous system can be controlled by conscious human activity. Control of the brain

through the RAS by means of conscious breathing is a method by which other functions of the body may be controlled, for example, heart rate, blood pressure, digestion, excretion and absorption.

2. The Nervous system:

- It influences higher functions of the central nervous system (Brain+Spinal cord.) like perception, planning, execution of tasks, learning & memory.
- It improves coherence between the two cerebral hemispheres signifying synchronization of logical and creative functions.
- It increases alertness, along with relaxation. Alertness decreases the reaction time of the brain.
- Spatial tasks (Spatial intelligence is used to perceive visual information and to conceptualize the world in tasks like navigation and in art) are enhanced during left nostril breathing and verbal tasks during right nostril breathing.
- Pranayama has useful implications in treating psycho physiological disorders associated with hemispheric and autonomic imbalance.
- Right nostril breathing correlates with the activity phase of the basic rest activity cycle, it activates the sympathetic nervous system as shown by an increase in the oxygen consumption and left nostril breathing decrease the sympathetic activity as manifested by an increase in the level of volar galvanic skin resistance.

3. Hormonal Balance:

- The glandular activity is increased and hormonal profile is balanced through pranayama.

4. Psychiatric Disorders:

- The Pranayama shows a reduction in sympathetic activity which is the basis of its use in stress management. It has been used in depression and melancholia.
- A thirty minute session of yogic stretching and breathing exercises produced marked improvement in perception of physical and mental energy. It increases the feeling of alertness and enthusiasm. It is more invigorating than relaxation or visualization techniques especially when practiced in a group setting.

5. Cardiovascular Response:

- The cardiovascular system is controlled by the ANS. Yoga accompanied by breath control increases cardiac output, decreases the hepatic, renal blood flow and increases cerebral blood flow in the peripheral vessels.
- Right nostril breathing activates the sympathetic nervous system and increase the heart rate. Alternate nostril breathing bring about a balance in the ANS

6. Respiratory system:

- *Pranayama* maintains a slow rhythmic pattern of breathing using both nostrils alternately.
- A significant increase in breath holding time and decease in the respiratory rate is documented. Improved exercise tolerance, faster recovery after

exercise, decrease in inhaler use, and improvements in bronchial provocation response has also been documented.

- *Pranayama* is believed to decrease the anxiety element as well. This is significant since asthma is a psychosomatic and chronic disease.

As the origins of *pranayama* can be traced back to Yoga, let me conclude with a brief note on Yoga.

Yoga

Yoga is a way of life. All yoga schools of thought emphasize the importance of the mind remaining calm, because as the saying goes, only when the water is still can you see through it.

Yoga is the result of human wisdom and insight on physiology, psychology, ethics and spirituality collected together and practiced over thousands of years for the well being of humanity. It has been defined as: "technologies or disciplines of asceticism and meditation which are thought to lead to spiritual experience and profound understanding or insight into the nature of existence."

A brief history of Yoga

Several seals discovered at Indus Valley Civilization (c. 3300–1700 BC) sites depict figures in a yoga or meditation like posture. The most widely known of these was named the "Pashupati seal"

In the Upanishads, an early reference to meditation is made in Brihadaranyaka Upanishad, one of the earliest Upanishads (approx. 900 BCE). The main textual sources for the evolving concept of Yoga are the middle Upanishads, (ca. 400 BCE), the Mahabharata (5th c. BCE) including the Bhagavad-Gita (ca. 200 BCE), and the Yoga Sutras of Patanjali (200 BCE-300 CE).

"Yoga is the inhibition (*nirodhaḥ*) of the modifications (*vṛtti*) of the mind (*citta*). Yoga helps the mind become fit for concentration. *Dharanasu cha yogyata manasah* (Yoga Sutras, II-53)

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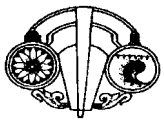

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To foster a love and understanding of the subjects that were close to VTT's heart and to ensure that the knowledge of the ages are nurtured for posterity, Sri Trunarayana Trust has been regularly organizing, since January 2000, lecture, cultural programmes by renowned scholars and reputed artistes. So far more than 400 programmes have been held.

These programmes have been held under specific series such as *Enjoying Sanskrit Kavya, Getting to know our ancient texts, Into the Future with Knowledge from Our Past, and Music of the Azhwars and Acharyas*. Two classical music festivals, *Kartikotsava* and *Udaya Taare* were also being held every year. Carnatic music CDs of verses from the *Nalayira Divya Prabandham* are now being brought out by the Trust and are available for purchase at the Trust address. The Trust is in the process of revamping its programme content and delivery with a view to reaching a wider audience.

As VTT had become synonymous with knowledge and learning, Sri Tirunarayana Trust felt that it was only right that it contribute in some small measure, to the furtherance of the cause of education in India. A corpus fund is being created for this purpose.

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